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EXTRACTS FROM THE GERMAN TECHNICAL PRESS.

TRANSPORT AIRPLANES.

By

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The transition stage of airplanes and aerial transport organizations, now known under the general title of transport airplanes and aerial transport, will be of short duration; and the shorter the better, for we are now on the brink of a new phase of development. Few people are aware of the first step made towards it, still fewer have any idea of the asymptote. It will be by work and experience alone that light can be thrown on the path of progress opened up by the spirit of enterprise and science.

This being the case, and in the hope that the following lines may be regarded rather as a challenge to further thought and to interchange of opinion than as a prophecy, I gladly accede to the request made by the editors of the "Luftweg" and prompted by an article by Dr. ESSICH, of Breslau, - appearing in Nos. 24/25 of that magazine - in contributing my opinion on the subject of "Transport Airplanes" from the constructor's viewpoint.

It is certain that problems will arise not only concerning airplanes of large dimensions, but for all intermediate sizes down to the very smallest. And these different sizes of airplanes will be utilized for different purposes.

The prospect of designing airplanes of large dimensions may be most attractive to manufacturers, but they would promote de-

velopment more directly by devoting their energies to the production of small airplanes, for the simple reason that higher technical finish will finally be attained - with a given amount of capital and time for construction - by producing an ever-improving series of small airplanes than by constructing a single giant airplane. Greater or less technical perfection has far more influence in the transit value of airplanes than the actual size of the machines, which is of comparatively slight importance.

Great caution is needed in applying the results of wartime construction to present conditions, because the demands that arose in wartime were almost entirely dictated by the requirements of the moment and forced conditions. We have, for instance, pneumatic tires of as much as 1750 by 300 mm. with a lifting power of 4000 kg. Airplanes of total weight amounting to 8000 kg. might therefore be constructed on ordinary two-wheeled landing-gears, and the total weight might even be 32000 kg. if the landing-gear had four double wheels like those made at Staaken during the War. As a matter of fact, wing construction, fuselage and landing-gear are so dependent on one another that little can be said about them in one short article. All-metal airplanes, with wings covered with the same weather and rust proof material, will certainly oust all other types in time, and their development must needs prove whether a smooth carrying surface is more favorable, or a complicated cellular construction covered with non-lifting lead, corrugated or otherwise. Wings with metal lifting surfaces like

those of the new 1000 HP monoplane built at the Zeppelin Works, Staaken, have many advantages, when rightly constructed, over other types of construction. As for the fuselage, there can be no doubt but that the method of construction with consolidated outer surface alone presents possibilities for the future. It only remains to be seen how soon sheet lead will take the place of corrugated lead. For the fundamental parts of engines, there are so many considerations of manufacture and accessibility to be considered that it is difficult to know whether the flying-boat method should be adopted, - with consolidated surface - or cellular partition work with a covering.

The power installation should always be designed and constructed with due reference to the fundamental principles laid down for airship engine construction. It is in any case risky to have a single propeller driven by several engines. The ambitious desire to overcome all the difficulties of vibration and oscillation, non-resistant fundamental parts and traces of wear leads to no material advantage that might not be otherwise obtained, in the case of transport airplanes, and with far less risk. If several small propellers are accurately installed and constructed, the efficiency obtained will be at least equal to that obtained with a single large propeller.

The question of the accessibility of engines during flight can be satisfactorily coped with for large airplanes as well as small ones. It may be managed either by connecting each one of a number of engines centrally installed in the fuselage with its

propeller by transmission gear, or by means of a thick wing like that used in the 1000 HP monoplane already mentioned (made at the Zeppelin Works, Staaken) with decentralized arrangement of the engines for favorable accessibility. Such utilization of the wing is of course more easily obtained with consolidated outer surfaces than with cellular wing bracing.

The decision in favor of or against centralized or decentralized installation is difficult, and it depends to a great extent on other conditions. Both should be further developed. The construction of transmission gear and its setting has not even yet been satisfactorily solved, but there are no fundamental difficulties in the way. We may take it as a general principle that if there need be several engines, they must be quite independent units; thus only is it possible that when one engine breaks down, the others continue to run and act as a reserve. If, on the other hand, a breakdown occurs in the collective gear - where there is always least working safety - of an airplane with a single propeller and several engines, the sole resource is gliding flight. And this same gear is scarcely likely to become safer as time goes on, as even improved construction can only mend matters slowly. Even if such gear were 100 times as safe in working as at present, a 4-engine airplane would still be less safe in working than one with four entirely independent power units.

For passenger transport, the decentralized installation is best adapted on account of the fact that the engine-room is well

away from the passengers. The fuel should in this case be kept away from the passengers and the engine as effectively as possible.

Airplane construction must fit in with present-day engine construction, now as in time to come, and an effort must be made to increase the working safety of airplanes through the most practical adaptation of both. There is still much that can be done and will be done along this line.

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